DOCUMENT RESUME

ED 229 034 IR 050 209

TITLE	Administrative Libraries Section. Special Libraries Division. Papers.
INSTITUTION	International Federation of Library Associations, The Hague (Netherlands).
PUB DATE	Aug 82
NOTE	25p.; Papers presented at the Annual Meeting of the International Federation of Library Associations (48th, Montreal, Canada, August 22-28, 1982).
PUB TYPE	Viewpoints (120) -- Reports - Descriptive (141) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Cooperative Planning; Databases; Foreign Countries; *Information Networks; *Information Retrieval; *International Organizations; Library Associations; *Library Cooperation; *Online Systems; Shared Services; Special Libraries; Telecommunications
IDENTIFIERS	Information Exchange Procedures; *Information Technology; *Machine Readable Bibliographic Data Bases; Offline Systems

ABSTRACT

In "Contemporary Needs and Possibilities to Improve the Exchange of Bibliographical Information/Data Between Administrative Libraries (with Special Reference to Modern Technologies)," a discussion of the exchange of machine-readable bibliographic records, Walter Niedermeyr (Federal Republic of Germany) advocates the development of German information retrieval systems as the first step toward online networks capable of providing shared cataloging, interlibrary loan, and cooperative acquisition facilities. He compares evolving communication and information technologies in North America and Europe, and proposes a continuous transition from an offline to an online interconnected bibliographic data system for German libraries. This would involve the transfer of data from magnetic tape services to central data files, investigation of the compatibility of data formats, and the development of programs to check for duplicate records. Also discussed are the offline processing of information, the design of information retrieval systems, the organization of data files, and character set problems. The paper concludes with a glossary of acronyms. (ESR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED229034

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☒ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

INTERNATIONAL FEDERATION OF LIBRARY ASSOCIATIONS

SPECIAL LIBRARIES DIVISION

ADMINISTRATIVE LIBRARIES SECTION

PAPERS

IR050209

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Carol Henry

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

réseaux
48e conférence générale de l'IFLA – Montréal
22-28 août 1982
Fédération internationale des associations
de bibliothécaires et des bibliothèques

networks
48th IFLA General Conference – Montréal
August 22-28, 1982
International Federation of Library
Associations and Institutions

1982

IFLA General Conference 1982
(Montreal)
Division: Special Libraries
Section: Administrative Libraries

53/ADM/1-E
208-RE

CONTEMPORARY NEEDS AND POSSIBILITIES TO IMPROVE THE EXCHANGE OF BIBLIOGRAPHICAL INFORMATION/DATA BETWEEN ADMINISTRATIVE LIBRARIES (WITH SPECIAL REFERENCE TO MODERN TECHNOLOGIES).

Walter NIEDERMEYR
Head of Systemsanalysis Group
Fachinformationszentrum Energie, Physik, Mathematik
Kernforschungszentrum Karlsruhe
(7514 Eggenstein-Leopoldshafen 2)
Bundesrepublik Deutschland

IRO3D209

Contemporary needs and possibilities to improve the exchange of literary information/data between administrative libraries (with special reference to modern technologies)

Analysis

- Introduction
- A look at the present situation
- The concept of a continuous transition to an interconnected on-line system by means of a retrieval system
- Transfer of literary data from magnetic tape services to central data files
- Compatibility of data formats
- Duplication check
- The off-line system
- Organization of data files
- Character set problems
- Conclusion

Introduction

The first electronic acquisition of data demonstrated the high rationalization effect to be achieved as a result of the multiple utilization of information once it has been written down. For the purchase of such data acquisition equipment which, compared with today, was still very expensive both with regard to purchase and maintenance, this effect served as a major argument in favour of purchasing such systems. Apart from the conditions prevailing in the United States of America and Canada, the expected positive development elsewhere has still not materialized. This is true not only of administrative libraries, but applies as a general phenomenon to the library sector as a whole.

This situation has not changed since the IFLA Conference held in 1980 in Manila, and the general stocktaking submitted there in Hans K. Kullmer's contribution [1], is still as valid today as it was then. Most literary units are still bibliographically covered and processed by subject-matter as often as they are acquired by individual libraries.

The situation has in the meantime however changed insofar as the declining library budgets and the particularly costintensive work procedures required for formal coverage and processing according to subject-matter, call for greater joint efforts in the mutual exchange of the intellectual processing work already accomplished, this being the only way to escape from the existing financial bottlenecks. It is above all emphasized by competent authorities that interconnected systems and library networks are routine working schemes in the library system of the United States which could hardly be dispensed with. It is therefore high time, particularly in Europe, to look for the reasons why there has not ensued any mutual cooperation between equivalent libraries by way of interconnected systems or other adequate methods, and to give careful consideration to the development of concepts as to how should be proceeded in the future. The time is again favourable for such endeavours due to the fact that the U.S.A. and Canada, after years of successful implementation, are at present in a phase of general deliberations prior to the breaking of new ground. This creative phase preceding the next forward step became necessary, because the new technologies are leading to a stronger decentralization.

The costs for long-distance data transmission have not decreased to such a degree that an interconnected system over larger distances would still represent an economical solution. Due to the mass production of inexpensive microprocessors, the costs for computers have shown a strong decline, and this make possible the decentralized installation of data processing equipment with a high storage capacity; at the same time, maintenance and software costs will show a downward trend, while the rentability of local systems will, on account of the shorter acces time, increase as against these of teleprocessing. Great importance is over the long run also being attached to such new techniques as fibre optics and satellite transmission, since they permit the decentralized collection and distribution of data to the user. Commercial enterprises as well as OCLC, WLN and RLIN (formerly BALLOTS) are in the process of testing the new technologies.

The most advanced designers include already the development of inexpensive optical mass storage units in their calculations. The DOR (Digital Optical Recording) disk as a further development of the VLP (Video Long Play) technique, has the potential of fundamentally revolutionizing the publication sector, the storage of primary reports, and the traditional lending practices. The lowering of costs in the computer industry has facilitated the use of highly resolving graphic terminals and of complicated and easy-to-handle editing techniques for electronic publishing.

Major producers have already grasped the significance of this development. Six publishing houses (Academic Press, Black World Scientific Publications, Elsevier Science Publishers, Pergamon Press, Springer-Verlag and John Wiley) which alone publish 1,500 scientific periodicals, have combined to back a joint project known as ADONIS (Articles Delivery On-Line Information Service), which has the objective of analysing the possibilities of direct storage of primary reports and their distribution via the DOR disk. As of 1984, it is envisaged to establish with the help of ADONIS a direct supply service for high quality primary reports which generally should become available without delays and free of copyright problems.

In this connection it is more than likely that the employment of these technologies will affect the transmission and storage in a way which should prove to be rather detrimental to the printed media.

A look at the present situation

The possibilities with regard to on-line access to data banks as demonstrated since 1960 by the SDC, since 1964 by Lockheed, and since 1965 by MIT, have initiated the conception of automated interconnected systems for libraries, and have decisively influenced their structure. The informationexplosion and the resulting intensified attention to question complexes pertaining to information techniques paved the way for the present situation in the United States.

The fast development was due to a number of favourable circumstances which did not exist in Europe:

1. In the U.S., there does not, and never did, exist as wide a separation between information systems on the one hand and libraries on the other. The development in the I&D sector was closely observed by the libraries. All that was done was to wait for the appropriate moment for moving in to prepare the own projects.

2. As far as the U.S.A. ist concerned, there have already for a long time existed generally practised rules (norms, so to speak), which proved very opportune for the establishment and operation of cooperative procedures, in particular cataloguing. Formal cataloguing, but also subject cataloguing and even the arrangement of the books on the shelves, are to a far-reaching degree performed by very many libraries according to the same rules (this holds true despite the fact that the USA is a country which is many times larger and has considerably more libraries than e.g. the Ferderal Republic of Germany). It also has proven as advantageous that cataloguing in the United States means formal cataloguing and subject cataloguing at the same time, so that the division between the two tasks ist not so severe.

3. American libraries are benefitting from lasting support by central services. Central printing of descriptions (Printed Card) ist being performed by the LOC since 1901. The National Union Catalogue which is also made available in the form of the MARC Tapes, represents a norm-setting force for the establishment and development of interconnected systems.

4. There exists closer cooperation in the U.S.A. between different types of libraries than is the case here. This can very well be illustrated by means of the OCLC network. This cooperative union is made up of general scientific libraries (university libraries), special libraries, administrative libraries, and a considerable number of public libraries.

5. The high technical standard in the utilization of EDP and the very effective employment of all available staff and financial resources, as well as the - in comparison to us - much higher profit assessments, have considerably furthered the development.

6. The initiative taken by private enterprises has reacted much more quickly to the demands for improved communications by means of appropriate networks. In Europe, the adaptation to userspecific requirements is, due to the prevailing monopolistic situation of the PTTs, not as much a question of the market, but rather a problem of exercising political influence. The demand for networks adapted for data exchange was satisfied in the U.S. still in the sixties with the packet switching network ARPANET, followed by THYMENET and TELENET. It was only in the early eighties that similar national networks could be made available on a routine basis in Europe.

The fact that these endeavours have proven worthwhile is to be shown by the OCLC figures. After its inception in 1971, not less than approximately 500 libraries with 800 terminals were already participating in 1975. By 1979, these figures had increased to roughly 2,000 participating libraries with 3,000 terminals. The total data records (OCLC control numbers) increased from 1 million in 1974 to over 5 million in 1979. At the same time, the utilization rate of libraries also climbed from about 80 % to over 90 % by 1980. Here, the advantage of the smaller libraries with utilization rates of about 95 % shows a particular strong impact. They catalogue only a minimum part themselves, but profit in return from the high bibliographical standard that is obligatory for all libraries as a condition of their joining.

Only in this way is the, in Westgerman(FRG) eyes, remarkably close cooperation between college and university libraries, public libraries, special libraries and some school libraries at all possible.

The growing dependency of the libraries upon these service centres, but also the growing interest in gaining a regional

and supraregional access, have induced the LOC and the Council of Library Resources (CLR) to consider ways and means of bringing about a cooperation between the various organizations operating interconnected systems. The investigation here concentrates primarily on the technical possibilities of networking the networks. OCLC is in the meantime engaged in further expansion and is, among other things, trying to get a foothold in Europe. The envisaged installation of a MARC International Technical Centre, perhaps at the Deutsche Bibliothek (FRG), would be considered by experts to represent a major crystalization point for the development of interconnected systems of our own.

In view of the high degree of compatibility existing in the hardware and software sector as well as on the network level, one might be tempted to envisage the installation of complete American systems. Although technically feasible, this could hardly be put into practice since a successful operation of any such scheme would necessitate many "minute" adaptations and adjustments which to carry through in a very complicated system is almost impossible. The only guaranty for a further stable development must therefore be seen in coping with the problem on the national level. The benefit of an interconnected system within the German (FRG) context, or other countries of comparable size, lies in using the data for several functions, i.e. the use for the purpose of cataloguing for interlibrarylending as well as cooperating in the acquisition and storage of literature, in connection with a better and more complete supply service to the users, accompanied at the same time by a lowering of costs due to coordinated acquisition policies.

<u>The concept of a continuous transition from an interconnected off-line to an interconnected on-line system by means of a retrieval system</u>

It is important to learn from the mistakes made in the development of interconnected systems and to use all available forces to tackle the problem from the base. On the strength of the experience made in the U.S.A., it is now possible to state

the conditions which must be met in order to successfully organize an interconnected system.
These are:

- a uniform set of rules, e.g. RAK, in which discretionary provisions must be replaced by definite terms
- a uniform acquisition scheme and/or mechanical exchange format (e.g. MAB 1)
- a clearly defined correctional procedure
- a fully matured system of duplication check
- a central editorial office with authority to render decisions in all problem cases.

Parallel to those, it is necessary to promote various activities which strongly support a project of this size:

- The development of an agreed upon dialogue command language which comprises all functions from acquisition to lending.
- The development of procedures and scenarios which enable a successive setting up of an interconnected system.
- Investigations of already existing activities with a view to include them in the system.
- Investigation of the market in search of suitable, extendable and compatible hardware and software and - in order to make sure of as favourable a start as possible - perhaps also the us of already existing algorithms.
- The setting up of a list of priorities with strict exclusion of all non-essential and troublesome cases and extra demands which would be detrimental to the development of the system.
- The setting up of a progressive scale which, depending on the means employed, shows the probable time at which the individual functions are expected to be operational.

- The establishment of a guidance committee which controls the phases of development, informs all participating parties on the progress of the project and in a later phase assumes the necessary testing and training of the connected centres, receives deficiency notices and proposals for improvements and enters them in a suitable memory file for subsequent action.

Above all, it is important to have a well-balanced concept which regulates the competencies for the performance of centralized as well as decentralized functions in the overall operation. This necessitates considerations with regard to the installation of high-speed communication networks, in order to enable above all the decentralized computers to arrive very rapidly at the latest position of the data files; for it is only in the on-line operation that all advantages of cooperative cataloguing can be realized within the interconnected system.

The time component determines whether it is possible to obtain a drastic rationalization effect. As a practical case in point could be mentioned the delays caused by the off-line processing in the interconnected system of North Rhine-Westphalia [2].

The descriptions collected on magnetic tape cartridges, which are all addressable by means of an identification number (ID), are being processed once a week. They are being linked with the local data collected in the libraries and are presented in a so-called interim catalogue. After the performance of checks and corrections, the data are transferred to the alphabetic catalogue, for which a half-yearly periodicity is being envisaged. The weekly processing cycle in conjunction with the additional time periods elapsing due to the transmission of data between the participants in the interconnected system and the centre, entails that the same books have been catalogued during that time by several libraries. This leads to the situation that different descriptions of the same title, each with a differing ID, appear in the system's catalogue. And vice versa, there exists during this uncontrolled time phase the possibility that descriptions of differing content are showing the same ID, a situation

which must be adjusted by special corrective procedures. Due to these difficulties, there does not exist any clear-cut criterion for easy recognition of multiple descriptions of identical titles in the linked file system. The elimination of these sources of error would require very complicated programmes and work procedures which do not justify the expenditure. It is therefore very important to distinguish between engaging in magnetic exchange for the purpose of reducing one's own cataloguing work, where the time component is not all that important, or if one contributes to an interconnected system in order to perform additional functions besides cataloguing, and in order to obtain for instance an instrument for accelerating long-distance lending.

For the purpose of initiating an interconnected system, it is not at all the same whether the cooperation is between different types of libraries or only between libraries of the same kind. In the latter case, the problems are much more simple.

Using the exchange of magnetic tapes as a starting base, there should definitely be a chance to progress with rather moderate means step by step towards an interconnected system, provided that a number of administrative libraries, for instance, could agree on some joint action. The situation would seem to be particularly favourable, because administrative libraries are generally divisions of larger governmental departments which use computer installations in executing their various tasks. However, even the absence of a computer should not be any real impediment, since many private computer centres are offering such services today at rather favourable conditions. The following shall be an attempt to examine the practical steps from the exchange of magnetic tapes all the way to a possible interconnected system, with special emphasis on the essential problems arising in this context.

Transfer of literary data from magnetic tape services to central data files

It is obvious that some library must volunteer to take charge of the EDP-related technical development or to assume the control

of work performed by outside service agencies. One of the first joint efforts of the participating libraries should be to find out where, all around the own organization, machinereadable literary data are originating and what type of magnetic tape services should be employed. In this connection, it is quite conceivable to consider not only the national libraries, but also the magnetic tape services in the I&D sector.

The next step would be to investigate the compatibility of data formats.

Compatibility of data formats

The bibliothecarial data acquisition formats may be subdivided either under the aspect of whether the elements of a bibliographical description are to be recorded in separate categories, or whether they are to be obtained from a block by way of a programme-orientated selection of non-sorting and control characters. In technical terms, these two possibilities are referred to as the analytical or the synthetical pattern of categories. The schemes actually used represent mostly a mixture of the two, with the trend going towards separation in many categories. The same is true of the acquisition formats in the I&D sector. In many libraries in which data acquisition and processing is performed by means of magnetic tape without the benefit of an interconnected system, some kind of an internal format is mostly used. The internal format contains additional library-specific processing and administrative data, which require a more detailed structuring than is the case with an exchange format. In most libraries, an extensive adjustment to international cataloguing practices has been carried through, so that in spite of great formal divergences it is still possible to perform a transformation of data into an agreed upon standard format without a loss of informational content. It is only the Westgerman(FRG) cataloguing practice which, due to the "Preussische Instruktionen" (Prussian Instructions), in particular on account of the "grammatical reglementation" and the non-entry of corporations, stands isolated. For that reason, a far-reaching adaptation to international standards was performed by means of developing the RAK. It may be assumed that most of the literature

is already available via the national magnetic tape services BNB, LOC and DB. The comparison between the Anglo-American Cataloguing Rule (AACR) and RAK is therefore of particular importance.

On behalf of the DFG (FRG), an analysis was performed with regard to the deviations in descriptive cataloguing existing between LOC and RAK, as a result of which the extent of and expenditure for modifications in connection with the transfer of outside data was determined. Of the approximately 4,000 printed cards of the LOC analysed, about 80 % concerned individual authors, while 12 % were attributed to corporate authors an 8 % fell under the heading subject-matter contributions. Complete conformity with the RAK in all main entries and all further description details was ascertained in 72.2 % of the overall descriptive cataloguing. As far as the abridged version of the RAK which excludes collection references is concerned, identical descriptions represented 77.8 % of total cataloguing, while in the case of non-consideration of subordinate description details relating to the collective titles of series of publications, this figure even amounted to 81.4 %. The deviations result mostly (appr. 66 %) from the Anglo-American rules which are oriented more towards the originator-principle, according to which main entries are rather made under the name of the publisher or corparate author than under the subject title.

The transformation from AACR to RAK requires a great deal of effort, while the adaptation of RAK to AACR poses no major problems. With RAK, the indexing by originator is being secured as a result of mandatory additional description details. The trend with AACR is going towards RAK, which is an indication that the deviations between the two systems will continue to shrink. Also as far as the approach forms for the registration of persons and corporate bodies are concerned, conformity rates of 99.75 % or 80.5 %, respectively, were ascertained. An adaptation to RAK, which is partly already contained in the British text, is to be expected here too.

The transformation of data should preferably be made into an internal format which does not have the for exchange formats typical structure based on directories, because the latter prove to be rather difficult to handle with regard to library updating services. Linear lists are better suited for processing by editing systems. An independent internal format comprising any number of categories desired is also to be recommended as an initial format for all further on-line activities, because the international as well as national regulations will be subjected to changes and modifications for some time to come. This will greatly facilitate the consideration of changes in the transformation programmes. By making use of today's programming techniques, transformations of formats can always be accomplished in a matter of weeks. In some instances, it may well be possible to fall back upon already existing programmes. The first "Special File" to be set up should of course be as free of multiple indexing as possible. For this purpose, it is necessary to develop a duplication check programme.

Duplication check

Special care should be devoted to the development of the duplicate controll programme, since it will be involved in each addition of new data. Such a programme cannot answer its purpose by merely comparing titles. It should rather include all important criteria which, via the contents of categories, are obligatorily covered. As a result of the extension of the sort criterion by the volume, number, name of edition and the year of publication, the automatic detection of identical titles will be considerably improved. The programming problems resulting from the introduction of simulated counts for individual volumes or counts of editions based on the unit "thousand", should not be underestimated. On account of different spelling and notations, it is necessary to exercise caution with the inclusion of localities and publishing houses in the sort criterion. The compression of comparative data by omitting all signs which are not truly essential, such as blank spaces, punctuation marks, double letters and umlauts (e.g. Müller - Muler), has proven successful [3].

The results of putting together such sort criteria are kept in a (sorted) match-file and serve as a basis of comparison for all new additions. With good match-codes, more than 98 % of all duplicates can be spotted, while the rest can be found and eliminated by pin-pointed checks or by chance. Of great importance for the speed of the programme is the sequence in the sorting of the comparative data. The instant comparison of ISBN, ISSN and the report number (if available) very quickly leads to decisions. The-in a way redundancy-free-file thus obtained should however still contain the CIP descriptions or those descriptions found on other order forms which are transferred to the file without further checking. These descriptions are provided with a date of initial registration and will be automatically eliminated at certain agreed upon intervals.

The off-line system

As emphasized already, the greatest difficulties in connection with the unification of descriptions arise as a result of off-line processing. The speeding up of processing work plays a decisive role in shortening the delivery times. It must be examined whether the participating libraries are in a position to reconcile their acquisition times with the delivery cycles. With smaller libraries, the chances in that respect are not bad at all. If this condition has been met, one could envision the following procedure:

- The library which assumes central responsibility sets up a retrieval system based on the established file.

- The libraries set up a broad search profile which is to be processed by the data bank; with newly established libraries via the overall file, with all others via the respective new additions.

- Depending on the decentralized equipment available, magnetic tapes or microfilm cards are made with the help of the descriptions found.

- Due to reasons of costs, the data bank will be developed in segments, i.e. old stocks are to be archived and can, if desired, be used for retrieval purposes.

The reason this procedure regarding an information system is proposed, is that information systems are matured to the greatest degree. There are many information centres which, on the basis of a preset design, develop data banks suitable for retrieval purposes from any desired application structures. Just the same, rather powerful retrieval systems are offered today as part of so-called "mini-computers".

The procedure is only roughly outlined here. A detailed analysis would exceed the scope of this paper. For that reason, only a few essential points should here be further gone into.

The design of the data bank must be structured in such a way that as many criteria as possible can be drawn upon (i.e. access via an "inverted file" with data on frequency word positions, the possibility of truncation of search words, etc.). A full inversion of titles is to be recommended in any case. The selection to be made from the retrieval systems should also be performed according to the following additional criteria:

- The possibility of making a detailed search from preselected stocks.

- The possibility to perform modifications by making use of points of intersection in the systems.

- The availability of a so-called list processor. The list processor is of great importance in connection with changes in the setting up of output formats, the adaptation to COM output formulas, and the setting up of settlement lists, etc.

- Possibilities with regard to an on-line updating and modification service within the system.

The demands made here all concern functions which are quite justified by the level of today's technology. These functions will also be required later on for the development of an interconnected on-line system. The procedure to arrive at an interconnected library system via a retrieval system is quite feasible, as was shown for instance by the installation of the "Zeitschriftendatenbank" (ZDB) by using an information retrieval system operated by the "Deutsches Bibliotheksinstitut" (DBI). Here, a useful concept has been conceived for the development of an on-line order component which is in conformity with the German (FRG) lending reglement (rules).

In order to facilitate the workability of the system as much as possible, it was demanded to divide the data bank into segments. This avoids the necessity of keeping complicating interim files. The new additions are inputted into the data bank and, via the date of the input, selected from a relatively small stock.

In its initial phase, this system however is only meant to serve as an instrument to indicate already completely covered items or literature that is still to be catalogued (CIP).

On the other hand, work on the off-line system should be pushed ahead to a point where the transition to an on-line system can be smoothly performed. In order to reduce the expenditure for the processing of catalogue printouts for direct or indirect utilization, depending on the respective availability of decentralized equipment, and in order to make sure that work is not being delayed during the time prior to reaching an agreement of all participating parties on a common format, all available descriptions identified as duplicates should be kept via reference lists in a separate file. This will increase the possibility of conveying to a participant an adequate format without additional print programmes.

The off-line variant does of course neither permit a direct search for specific publications, nor a direct acceptance into own stock, or an acquisition or correction of available literature

that is binding for all. The rather broadly applied search profile is meant to limit the entire stock to the descriptions which are of interest, in the process of which it is necessary however to put up with much ballast in order not to lose any of the relevant descriptions. The bibliographical descriptions found are allocated according to agreed upon sort keys, so as to ensure that an effective search for catalogue stocks possibly to be taken over is carried through. As part of this search, it may also be decided whether relevant titles from "CIP stocks" can be taken over. If, as a result of the method "search and take over", more than 80 % of the relevant descriptions can be found and taken over, as is to be expected, a rationalization effect would have been obtained which should justify the expenditure.

Since the retrieval systems can also be used for direct access, it will be possible for individual participants who, due to their spatial proximity to the production centre can benefit from favourable rates for data teleprocessing , to chose this way of making a direct search. In this case, also an individual search with subsequent printout via stand-by printer is possible. Depending on the development of the tariff structure, the circle of participants benefitting from direct access could be enlarged. In the meantime, information values based on experience have been made available from the users of off-line linkage, which make it possible to compute the "treshold value" for the transition from off-line to on-line service. In libraries equipped with EDP, a utilization of the today possible techniques of file transfer, by simultaneously benefitting from cheap night tariffs, might also be considered.

Ultimately, all further going steps are more or less predetermined by the already existing interconnected systems. What is important in this connection is to shift the switches the right way at the beginning and, by avoiding the wrong tracks experienced in the meantime by the predecessors of this development, to arrive at the most appropriate organizational decisions, with data base management and character set problems being two important items to be considered.

Organization of data files

With on-line solutions, a form of organization of data files is needed which takes into account the cross reference nature of bibliographical descriptive cataloguing. With search strategies in the information-retrieval system, it has been a long-standing practice to bring about linkages to the physical data via so-called "pointers", in order to very quickly achieve results without moving the text data.

In developing an interconnected system, it is useful to perform an additional separation of the texts into a multi-file structure of mutually linked files relating to proper names, corporate bodies, descriptor entries, stocks, and subjectmatter coverage. This measure will lay the foundation for a subsequent upkeep of stock files and files of corporate bodies which, if carried along in the text, would prove to be an extremely difficult task. Here it is necessary to fall back upon previously gained experience (as for instance with DBI in connection with the setting up of the ZDB, which operates with a descriptor entry file, a file of corporate bodies, and a stock file). This procedure must also be applied later on with the linking of the local data and with the linkage of complex bibliographical structures, such as for instance series with subseries and further subdivisions by volumes, partial volumes, etc.

It is to be expected that cleverly elaborated systems with automated cross reference technique - the algorithm of the cross reference technique is inputted in parameter form at the time of the data bank generation - and integrated subsystems for catalogue printing, duplication control, transformation moduls, etc., will become available in the near future. It is in the nature of things that these systems are very expensive to buy or to lease. It should be worthwhile however to think about the possibility of having these services perhaps be performed through computer service centres in the form of time-sharing.

Character set problems

For most processes in which data processing is employed suffices a character complement which includes Latin letters, Arabic numerals, as well as punctuation signs and basic mathematical symbols. In cataloguing literature in their most differing languages, there appear many characters which can only be represented by way of enlarging the character complement or by combinations of already existing characters. Additional differences do exist in various types of libraries.

A unification on non-Latin types of script is in part ensured as a result of international transliteration regulations.

There also exists an ample amount of literature on these subjects. With an interconnected system, it is unavoidable having to deal with a great number of differing characters. In general, the following rules for simplifying procedures should be observed:

- On account of the differing equipment available in decentralized sectors, only a total of 90 characters should be permitted for direct coding. All other characters should be transcribed by means of so called protypes.

- The texts are to be converted in line with the available terminal equipment (terminal, printer, laser printer, photocomposition, etc.). Where only simple devices are available (e.g. TTY), a circumstantial transcription may be acceptable in place of white spaces (loss of information).

- Any character set if enlarged, must comprise the full set of characters of the preceding font

- Diacritics or other non-essential characters are to be omitted.

- Control characters must not be print characters.

- The allocation of transcriptions to genuine characters is regulated by means of concordance tables, the upkeep of which is a central function.

Conclusion

In connection with the subject matter dealt with here, other services also offered today via communication networks were examined with a view to their relevant usefulness. Videotex as well as interactive videotex, and teletex are easy to use networks offering specific basic functions for text processing. Interactive videotex is the only service equipped with a computer which permits the telephonic calling up of "television pages" via a hierarchical pattern of question complexes. The inputting of the pages into the computer again requires the services of a computer and is a complicated procedure. Moreover, there is very little resident storage capacity available on account of the many providers of information. It is not worthwhile to go into the rather poor possibilities in detail. The only thing that pays is to observe the tariff structure of the individual networks and by means of simulation of the communication protocols, perhaps use them as transparent exchange or switching networks.

Information retrieval systems have been proven to be the most promising systems for a successful entry into the "philosophy of interconnected systems". The large interconnected systems themselves are too complex for the initial step and can only work successfully as comprehensive systems. It should also be a rule not to make the "third" step before the first one. The failure in the realization of interconnected systems, in particular in Germany (FRG), may well also be due in part to the conception of systems which are meant to solve in the initial phase and all at once the problems of cataloguing, interlibrary lending and cooperative acquisition policies (preferably local lending procedures too).

Although all this here is only intended to show a first step towards the goal envisaged, it should have become obvious that even such a "primitive version" must be carefully examined with regard to its impact and possible problems entailed.

The realization of these schemes will in future offer abundant fields of activity for EDP experts as well as librarians.

References

1) Kullmer, Hans K.: The Libraries of the National Statistical Offices in the world. Comments on the results of an enquiry. In: INSPEL, Berlin (Official Organ of the IFLA Division of Special Libraries).
Part 1: 15 (1981) 3, 125-144.
Part 2: 15 (1981) 4, 219-251.

2) Cf. Heinz-Werner Hoffmann: Daten- und Dateiorganisation beim Hochschulbibliothekszentrum des Landes Nordrhein-Westfalen. In: Bibliotheksautomatisierung, Benutzererwartungen und Serviceleistungen.
München 1980 ste 67 ff.

3) Velde, Guntram. In: Bibliothek, Forschung, Praxis
S. 2981. No. 2.

Glossary

A A C R :	Anglo - American Cataloguiung Rules
A D O N I S :	Articles Delivery One-Line Information Service
A R P A N E T :	Advanced Research Projects Agency Network
BILDSCHIRMTEXT :	is the West German Bundespost' s interactive videotex - service
B N B	British National Bibliography
C I P :	Cataloguing in Publication
C L R :	Council of Library Resources
C O M :	Computer Output Microfilm
D B :	Deutsche Bibliothek (FRG) German Library
D B I :	Deutsches Bibliotheks Institut (FRG) German's Institute of Library Research
D F G :	Deutsche Forschungsgemeinschaft (FRG) German Society for Research and Development
D O R :	Digital Optical Recording
E D P :	Electronic Data Processing
E D V :	Elektronische Datenverarbeitung Electronic Data Processing
I D - N O :	Identifikation - Nr. Identification - No.
I & D :	Information and Documentation
ISBN :	International Standard Book Number
ISSN :	International Standard Serial Number
L O C :	Library of Congress
M A B :	Maschinelles Austauschformat für Bibliotheken Machine Readable Format for the Exchange of Literary Data between Libraries
M A R C - T A P E S :	Machine Readable Cataloguing

M I T :	Massachusetts Institute of Technologie
OCLC :	Ohio College Library Center
P T T :	Post, Telegraph, Telephon
R A K :	Regeln für die alphabetische Katalogisierung Alphabetic Cataloguing Rules
R L I N :	Research Library Information Network
S D C :	Systems Development Corporation
TELETEXT :	An improved Teletex - type service operating at higher speed and with a more extensive
TELENET :	Package switching Network
TYMENET :	Package switching Network
T T Y :	Tele Type Service
VIDEOTEX :	The generic name used for electronic systems that use a modified TV set to display computer based information. Interactive systems using, typically, the TV set and telephone line, are called telephone - based or interactive videotex. Broadcast services are called broadcast videotex, or teletext.
V L P :	Video long Play
W L N :	Washington (State) Library Network
Z D B :	Zeitschriften Datenbank Serials data base